



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/817,361

04/02/2004

Richard I. Masel

15581US01

2569

24978 7590 10/20/2008

GREER, BURNS & CRAIN  
300 S WACKER DR  
25TH FLOOR  
CHICAGO, IL 60606

EXAMINER

WILLS, MONIQUE M

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

10/20/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/817,361	<b>Applicant(s)</b> MASEL ET AL.	
	<b>Examiner</b> Monique M. Wills	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-24 and 51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-24 and 51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Response to Amendment***

This Office Action is responsive to the Amendment filed July 3, 2008. The rejection of claims 1, 2, 5-24 & 51 under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434, is overcome. The rejection of claims 3-4 under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of Pomeroy et al. U.S. Pat. 3,297,487, is withdrawn. The pending claims are rejected as follows:

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5-24 & 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of Masel et al. U.S. Pub. 2004/0045816.

With respect to claim 1, Hampden-Smith teaches a fuel cell comprising: an anode to which said fluid fuel is directed, said anode having an electrocatalyst associated therewith, said electrocatalyst comprising palladium nanoparticles; a cathode to which said fluid oxidant is directed, said cathode electrically connected to said anode; and an electrolyte interposed between said anode and said cathode. See Paragraphs 6 & 102. With respect to claims 1 & 16, 100% formic acid may be used (par. 6). With respect to claims 5 & 6. the electrolyte is an ion exchange membrane such as a proton exchange membrane. See paragraphs 6 & 93. With respect to claim 7, the proton exchange membrane comprises a perfluorosulfonic acid ionomer (par. 93). With respect to claim 8, it would be reasonable to expect the ion exchange

Art Unit: 1795

membrane to be substantially impermeable to the fuel stream, because Hampden-Smith teaches the same fuel and membrane as set forth by Applicant. Support for this assertion is provided in MPEP 2112.01, “ [where] [p]roducts of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, since Hampden-Smith teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). With respect to claim 9, the electrolyte includes acid electrolytes (par. 93). With respect to claims 10-12, the palladium catalyst nanoparticles have a diameter of 1 to 10 nm. See paragraph 102. With respect to claim 51, the electrocatalyst is palladium nanoparticles (See par. 102).

Hampden-Smith does not expressly disclose: formic acid fuel (claim 1); surface area of at least about  $5\text{m}^2/\text{g}$  (claims 13-15); 25% to 65% formic acid (claims 17-20); cell is capable of generating a power density of at least  $150\text{mW}/\text{cm}^2$  (claims 21-22); cell is capable of generating open circuit voltage of at least 0.8 V (claim 23) or wherein

Art Unit: 1795

the catalyst is configured to promote reaction of said formic acid via a direct path that diminished formation of a CO intermediate.

Masel teaches that it is well known in the art to fuel cell with formic acid and palladium catalyst.

However, it would have been obvious to one of ordinary skill in the art in the time the instant invention was made to employ a fuel cell comprising formic acid as taught by Masel, in the fuel cell of Hampden-Smith. See *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious).

With respect to claims 13-15, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the surface area of at least about 5m<sup>2</sup>/g, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the surface area directly effects utilization of the catalyst material.

With respect to claims 17-20, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the formic acid concentration of 25% to 65% , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the concentration of fuel directly effects utilization of the catalyst material.

With respect to claims 21-22, it would have been reasonable to expect the fuel cell of Hampden-Smith to generate an open circuit voltage of at least 0.8 V, since the cell is made from the same material as the instant claims. Support for this assertion is provided in MPEP 2112.01, “ [where] [p]roducts of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, since Hampden-Smith teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

With respect to claim 23, it would have been reasonable to expect the catalyst of Hampden-Smith to promote reaction of said formic acid via a direct path that diminished formation of a CO intermediate, since the cell is made from the same material is as the instant claims. Support for this assertion is provided in MPEP 2112.01, “ [where] [p]roducts of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, since Hampden-Smith teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject



matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of Masel et al. U.S. Pub. 2004/0045816 and further in view of Pomeroy et al. U.S. Pat. 3,297,487.

Hampden-Smith in view of Masel teaches a fuel cell as described in the rejection recited hereinabove.

However, the reference does not expressly disclose anode/cathode enclosures.

Pomeroy teaches that it is well known to employ anode/cathode enclosures in polymer electrolyte fuel cells.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the anode/cathode enclosures of Pomeroy in the fuel cells of Hampden-Smith, in order to increase fuel/oxidant exposure to the electrodes.